University College London Meeting

Demonstrations

Fluorescent detection of glutamate uptake in rat hippocampal slices from the pH change uptake produces
Alessandra Amato, Laura Ballerini and David Attwell. 2

A new technique for field testing vertical jump height
M.E. Mills. 3

Whole-cell patch clamp recording of cells cultured from embryonic chick retina
Suzette Allcorn and Peter Mobbs 4

Analysis of physiological changes in magnetic resonance image sequences
A.R. Gardner-Medwin and N. Van Bruggen 5

The use of Mg^{2+} macroelectrodes to measure the Mg-ATP dissociation constant
Weiqi Zhang, Anita Truttmann, Daniel Lüthi and John A.S. McGuigan 6

The use of a carbocyanine dye, JC-1, to monitor changes of mitochondrial potential in isolated mammalian cells
Michael R. Duchen, Martin Crompton, Stefan Peuchen and Alex V. Nowicky. . . . 7

A system for studying tension transients in segments of skinned muscle fibres from rabbit psoas
M. Linari, A. Aiazzi, M. Dolfi, G. Piazzesi and V. Lombardi. 8

Responses of bipolar cells isolated from retinal slices of dogfish to concentration jumps of glutamate
R.A. Shiells and G. Falk 9

Simultaneous measurements of intracellular calcium and mitochondrial potential in isolated mammalian cells
Alex V. Nowicky, Stefan Peuchen, John B. Clark and Michael R. Duchen 10

A closed microperfusion chamber for rapid solution exchange in patch clamp studies
A. Savchenko and S. Hering. 11

Communications

Deficits of human rhythmic voluntary movements in Huntington's disease
J.S. Freeman, F.W.J. Cody, D. Craufurd, D. Neary and J.S. Snowden. 12

Interlimb co-ordination in humans during split-belt locomotion
V. Dietz and W. Zijlstra 13

Changes in common drive to motoneurones innervating two thumb muscles studied during development in man
J. Gibbs, C. Domnesteanu, L.M. Harrison, A.L. Evans and J.A. Stephens 14

Reciprocal actions of midbrain stimulation on static and dynamic fusimotor neurones of the hindlimb in anaesthetized cats
A. Taylor, R. Durbaba, J.F. Rodgers and A.J. Fowle 15

Inhibition of mid-lumbar interneurones by lumbosacral interneurones in the anaesthetized cat
P.J. Harrison, G.P. Connolly and M. Jefford 16

Modelling of connections to inspiratory motoneurones in the anaesthetized cat
C. Vaughan and P.A. Kirkwood 17

Vestibular-evoked EMG responses in human neck muscles
J.G. Colebatch and J.C. Rothwell 18

A model of predictive motor programming in ocular pursuit
G.R. Barnes 19

Responses to transcranial magnetic stimulation of human motoneurones at different firing rates
E. Olivier, P. Bawa and R.N. Lemon 20

Does magnetic stimulation over the human occiput activate the cerebellum? Observations in a patient with agenesis of one cerebellar hemisphere
B.-U. Meyer, S. Roericht and B. Conrad 21

The polarity of magnetic coil inhibition of human visual cortex
V.E. Amassian, P.J. Maccabee, R.Q. Cracco, J.B. Cracco, M. Somasundaram, L. Eberle and A.P. Rudell 22

Direct clinical monitoring of vestibulo-ocular reflex errors
A.R. Gardner-Medwin, A.T. Bucknill, A. Yue and L.M. Luxon 23

Visuo-motor pursuit movements in ataxic patients with cerebellar damage
R.C. Miall, P.N. Haggard and J.F. Stein 24

Effects of arachidonic acid on AMPA receptor currents in isolated cells and tissue slices from the rat hippocampus and cerebellum
Barbara Miller, Monique Sarantis and Yury Kovalchuk 25

Detection of K^+ transported out of isolated salamander glial cells on the glutamate uptake carrier
Alessandra Amato, Daniel Adams and David Attwell 26

Nitric oxide activates the central feeding programme in *Lymnaea stagnalis*
L.L. Moroz, J.-H. Park and W. Winlow 27

Antibodies against cerebellar nitric oxide (NO) synthase label cells in the CNS and peripheral tissues of the freshwater snail, *Lymnaea stagnalis* (L.)
L.L. Moroz and A.J. Roylance 28

Electrophysiological characterization of 5-HT_{1A}-like receptors in cultured identified neurones of *Lymnaea stagnalis* using R(+)-hydroxy-8-DPAT hydrobromide
A. Walcourt-Ambakederemo and W. Winlow 29

Induction of LTP by AlF_4^- involves phosphoinositide turnover but not NMDA receptor activation
N.A. Breakwell and S.J. Publicover 30

Heterosynaptic long-term depression of synaptic transmission in isolated slices of rat hippocampus can be induced postsynaptically in the presence of a $GABA_A$ receptor antagonist
Geri Christofi, Michael F. Barry and Lynn J. Bindman 31

Reduced internal ATP concentrations and mitochondrial inhibition activate K^+-ATP channels in isolated dopaminergic substantia nigra neurones from the rat
Jochen Röper and Frances M. Ashcroft 32

Pre- and postnatal development of the electrical properties of mouse thalamic neurones *in vitro*
Nicola MacLeod, Christopher Turner and Beau Lotto 33

Lack of effect of ATP-K^+ channel openers and inhibitors on excitatory synaptic inputs to the rat substantia nigra *in vitro*
G.A. Hicks and G. Henderson 34

Spontaneous inhibitory postsynaptic currents recorded in hilar neurons of the rat dentate gyrus *in vitro*
I. Mody and I. Soltesz 35

Electrophysiology and morphology of connections between pyramidal neurones in the deep layers of rat motor cortex *in vitro*
Jim Deuchars, David C. West and Alex M. Thomson 36

Fate of central nervous system neurons after selective removal of target motoneurons in adult cats
R.R. de la Cruz, A.M. Pastor and J.M. Delgado-García 37

Calcium dependence of the facilitation of glial voltage-gated sodium channels by nerve impulses in isolated frog optic nerve
R.K. Orkand and H. Marrero 38

Proton transport by the plasma membrane Ca^{2+}-ATPase of voltage-clamped snail neurones in isolated ganglia
Christof J. Schwiening, Helen J. Kennedy and Roger C. Thomas 39

Upregulation of the POMC gene in regenerating motoneurones of the mouse
S. Hughes and M.E. Smith 40

α-Adrenoceptor inhibition of voltage-gated calcium current (I_{Ca}) in cultured rat sympathetic neurones is reduced by antibodies to the α-subunit of the G protein G_o
M.P. Caulfield, Y. Vallis, I. Mullaney, G. Milligan and D.A. Brown 41

Changes in $[Ca^{2+}]_i$ in response to ATP in astrocytes cultured from the forebrain of the adult rat
Stefan Peuchen, John B. Clark and Michael R. Duchen 42

ATP increases intracellular Ca^{2+} in TRH-responsive rat anterior pituitary cells
Mei-Lin Wu, W.T. Mason and G.J. Law 43

ROMK1 expressed in *Xenopus* oocytes encodes a Mg^{2+}-dependent inwardly rectifying potassium channel
C.G. Nichols, K. Ho and S. Hebert 44

Block of outward rectifier DRK1 potassium channels, expressed in *Xenopus* oocytes, by Mg^{2+}
A.N. Lopatin and C.G. Nichols 45

K(M)-channels in rodent neuroblastoma × glioma hybrid cells transfected with muscarinic m1 receptors: inhibition by muscarine and bradykinin
J. Robbins, A.A. Selyanko and D.A. Brown 46

Potentiation of the isolated NMDA receptor-mediated excitatory postsynaptic current following metabotropic glutamate receptor activation and tetanic stimulation in rat hippocampal cells
John O'Connor, Michael J. Rowan and Roger Anwyl 47

Single channel kinetics of recombinant NMDA receptors
Peter Stern, Philippe Béhé, Ralf Schoepfer and David Colquhoun 48

Effect of ACTH (4–10) on evoked acetylcholine release at the mouse neuromuscular junction *in vitro*
David A. Davies and Margaret E. Smith 49

Different effects of nifedipine and ω-conotoxin on Ca^{2+}-activated K^+ currents in acutely isolated chick ciliary ganglion neurones
Mary E. Wisgirda and Stuart E. Dryer 50

Inactivation of a transient outward current in bovine adrenal fasciculae cells
C. Ojeda and A. Bilbaut 51

The effect of combined inspiratory and expiratory viscous resistances on the end-tidal position in man
Kerry Grady and I.T. Campbell 52

Prolongation of breath-hold time following treatment with an L-menthol lozenge in healthy man
A. Sloan, S.C. De Cort and R. Eccles 53

Cardiorespiratory effects of inhalation of L-menthol in healthy humans
S.C. De Cort, J.S. Rowe and R. Eccles 54

Effects of prior hyperventilation on the ventilatory response to exercise in man
J.H. Howell and B.A. Cross 55

Exercise-induced metabolic acidaemia and the slow phase of O_2 uptake kinetics during muscular exercise in humans
Bradley Bohnert, Susan A. Ward and Brian J. Whipp 56

The effect of inspiration of 100 % O_2 on the ventilatory response to incremental exercise testing in man
P. McLoughlin, R. Cope, R.A.F. Linton and D.M. Band 57

Motor cortical activation in exercise-induced hyperpnoea in man: evidence for involvement of supra-brainstem structures in control of breathing
G.R. Fink, L. Adams, J.D.G. Watson, J.A. Innes, B. Wuyam, I. Kobayashi, D.R. Corfield, K. Murphy, R.S.J. Frackowiak, T. Jones and A. Guz 58

Inhibition of sympathetic preganglionic neurones by stimulation of the nucleus tractus solitarii (NTS) in anaesthetized rats: role of inhibitory amino acids at a spinal site
D.I. Lewis and J.H. Coote 59

Reversible cooling in the pons abolishes the fall in respiratory activity due to adenosine in anaesthetized neonatal lambs
P.J. Moore, M.C. Bohm and M.A. Hanson 60

Evidence concerning the site of facilitation of phrenic motoneurone output in response to volitional inspiration in man
N.J. Davey, K. Murphy, D.W. Maskill, A. Guz and P.H. Ellaway 61

Evidence for inhibitory mechanisms mediating hypoglossal motoneurone response to mild hypoxia in anaesthetized neonatal kittens
Julie A. Smith, Fei Li and Ray Noble 62

Origin and synaptic control of rhythmic activity in hypoglossal neurones recorded *in vitro* from brainstem slices of rats
Julian F.R. Paton, Jan-Marino Ramirez and Diethelm W. Richter 63

Rapid, intense peripheral vasoconstriction in the llama fetus *in utero* during acute hypoxaemia at 0·6–0·7 of gestation
D.A. Giussani, R.A. Riquelme, C.R. Gaete, F.A. Moraga, E.M. Sanhueza, M.A. Hanson and J.A. Llanos 64

Modification of the rat carotid body type-I cell mitochondria by high altitude exposure
Xue Dahai, Yang Fengxiang and Denise Bee 65

Respiratory sinus arrhythmia does not reflect cardiac vagal tone during exercise in man
Barbara Casadei, James Moon and Alberto Caiazza 66

Myocardial tissue perfusion and systemic haemodynamics in a pentobarbitone-anaesthetized rabbit model of myocardial ischaemia and reflow
D. Fluck, P. Etherington, D. O'Hare, N. Flores, K.H. Parker, C.P. Winlove and D. Sheridan 67

Coronary myogenic vasodilatation in the dog: possible role of nitric oxide
Donatella Gattullo, R.J. Linden, G. Losano, A. Merletti and P. Pagliaro 68

Action of an A_1 adenosine receptor antagonist on the cardiovascular response to defence area stimulation in cat and rat
J.H. St Lambert, M.S. Dawid-Milner, L. Silva-Carvahlo, G.E. Goldsmith and K.M. Spyer 69

Metabolic acidosis attenuates the cardiac protective effect of noradrenaline in the isolated working rabbit heart during raised extracellular potassium
Stewart P. Leitch, Christopher J. Hammond and David J. Paterson 70

Effect of two anaesthetics on myocardial tissue perfusion in a rabbit model of myocardial ischaemia and reflow
D. Fluck, P. Etherington, N. Flores, K.H. Parker, D. O'Hare and D. Sheridan .. 71

Supine exercise lowers blood pressure in human subjects with sympathetic denervation
G.D.P. Smith, C. Matteoda and C.J. Mathias 72

Growth hormone responses to treadmill sprinting in sprint- and endurance-trained male athletes
M.E. Nevill, D.J. Holmyard, G.M. Hall, P. Allsop, A. van Oosterhout and J.M. Burrin 73

Increases in plasma cholesterol in elderly and young adults during exposure to cold without increase in Factors VII or X
M. Mattock, Denise Syndercombe-Court, W.R. Keatinge, G.C. Donaldson, Penelope J. Neild and Maria Caunce 74

Ageing, strength and human vertical jumping ability
M.E. Mills 75

Cellular immune activity in response to increased training of the elite athlete
P. Jakeman, D. Hopkins and G. Warrington 76

Sarcomere additions in stretched and electrically stimulated latissimus dorsi muscles of unanaesthetized rabbits
V.M. Cox, H. Wright, P. Williams, K. Gillott and D.F. Goldspink 77

Contractile characteristics of human quadriceps femoris muscle in active elderly and young adults
M.C. O'Connor, P. Carnell, J.A. Manuel and O.M. Scott 78

Tension responses in permeabilized muscle fibres of the rabbit following laser pulse photolysis of a new 'caged ATP', the P^3-3',5'-dimethoxybenzoin ester of ATP
H. Thirlwell, G.P. Reid, J.E.T. Corrie, D.R. Trentham and M.A. Ferenczi 79

Force loss during high-intensity exercise in relation to metabolic changes in skeletal muscles of anaesthetized rats
A. de Haan, J.C.M. Koudijs and H.G. Westra 80

Mechanical hysteresis and creep in rabbit psoas muscle fibres
N. Thomas, R.A. Thornhill and D.W. Keddie 81

Effect of stimulation frequency on heat and energy output during shortening in single muscle fibres from *Xenopus laevis* at 20 °C
H.P.J. Buschman, G. Elzinga and R.C. Woledge 82

Muscle strength and power after strength-training by women aged 75 and over: a randomized, controlled study
D.A. Skelton, C.A. Greig, K. Malbut and A. Young 83

Are the National Fitness Survey strength and power thresholds for performance of everyday tasks too high?
D.A. Skelton and A. Young 84

The effects of tenotomy on the microcirculation of soleus muscle in anaesthetized rats
S.J. Heap and O. Hudlicka 85

Maximum shortening velocity and myosin heavy chain and alkali light chain isoform composition of skinned fast fibres from rat skeletal muscles
R. Bottinelli, R. Betto and C. Reggiani 86

Synchronous length oscillations during loaded shortening of isolated muscle fibres from frog
K.A.P. Edman and N.A. Curtin 87

ATP turnover and relaxation rate in fatigued human anterior tibialis muscle
D.A. Jones, D.L. Turner, D.J. Newham and D.B. McIntyre 88

Changes in the force/velocity relationship of the fatigued human adductor pollicis muscle
D.A. Jones, H.M. Seymour, S. Ward and J. Rowbury 89

Shortening force in electrically stimulated human muscle–tendon complex is enhanced by pre-stretch but is independent of pre-stretch velocity
C.S. Cook and M.J.N. McDonagh 90

Electrical field stimulation generates calcium spikes in mouse eggs
Jean-Pierre Ozil and Karl Swann 91

Imaging calcium influx and calcium wave kinetics at fertilization in sea urchin eggs using confocal microscopy
I. Gillot, A.D. McDougall and M.J. Whitaker 92

Ionomycin-induced Ca^{2+} influx in cultured human endothelial cells
Anthony J. Morgan and Ron Jacob 93

Diminution of a delayed rectifier potassium current in isolated pulmonary arterial cells associated with chronic hypoxia in rats
S.V. Smirnov, T.P. Robertson, J.P.T. Ward and P.I. Aaronson 94

Inward rectifier potassium currents in smooth muscle cells from rat resistance-sized cerebral arteries
J.M. Quayle, J.G. McCarron, J.E. Brayden and M.T. Nelson 95

Excitatory and inhibitory junction potentials in canine antral circular muscle
B.F. King and G. Burnstock 96

Characteristics of the non-adrenergic, non-cholinergic post-stimulus contraction of the bladder neck muscle in sheep
K.D. Thornbury and J. Peake 97

Frequency potentiation of a low-voltage-activated Ca^{2+} current in bone cells
S.J. Publicover, A.J. El Haj and G.P. Thomas 98

Function and cyclophosphamide produce relationships between tooth length and eruption rates with opposite slopes in rats
R.A. Burn-Murdoch 99

Regional variations in electrical properties of human femoral head cartilage characterized with AC impedance *in vitro*
M. Levinkind, C.P. Winlove, T.J. VanderNoot and J. Urban 100

Electrical impedance tomography (EIT) imaging of cortical spreading depression in the anaesthetized rabbit
K. Boone, A. Lewis and D.S. Holder 101

Effects of hypertrophy on relaxation of cardiac myocytes isolated from the guinea-pig
R.U. Naqvi and K.T. MacLeod 102

The effect of adenosine nucleotides on the large-conductance Ca^{2+}-activated K^+ channel in guinea-pig isolated taenia caeci myocytes
A.J. Sellers and M.L.J. Ashford 103

Possible role of protein kinase during the activation of delayed rectifier potassium currents in guinea-pig isolated ventricular cells
S.C. Connors, A. Gooch and D.A. Terrar 104

Effects of neuropeptide Y on L-type calcium current in isolated left ventricular myocytes from guinea-pig
S.M. Bryant and G. Hart 105

Effects of isoprenaline and neuropeptide Y on intracellular ionic calcium transients are additive in contracting rat ventricular cardiac myocytes
S. Ribarič and B. Somasundaram 106

Distribution and activation time courses of cAMP-induced chloride current in isolated atrial and ventricular myocytes from guinea-pig and frog hearts
S. Pelzer, Ya. M. Shuba and D.J. Pelzer 107

Effects of stimulation rate on basal and cAMP-augmented calcium channel current in guinea-pig ventricular cardiomyocytes
S.P. Kaspar and D.J. Pelzer 108

Differential modulation of Cl^- and L-type Ca^{2+} channels by photoreleased cAMP in guinea-pig cardiac ventricular myocytes
R.Z. Kozlowski, L.J. Goodstadt, V.W. Twist and T. Powell 109

The effect of halothane on intracellular calcium and contraction in ventricular cells isolated from rat hearts
M. Robinson, S.M. Harrison, W. Winlow, P.M. Hopkins and M.R. Boyett 110

Effects of melatonin, administered at various times of the day, on the release of neurohypophysial hormones from the rat hypothalamus *in vitro*
Sharifah Yasin, A. Grossman and Mary L. Forsling 111

Progesterone metabolism in mouse brain homogenates
M.P. Carey, C.A. Aniszewski and J.P. Fry 112

Feeding-induced expression of an immediate early gene in rat stomach
R. Dimaline and S.-M. Miller 113

Vasoactive intestinal peptide stimulates Neuropeptide Y gene expression in PC12 cells by activation of protein kinase A
D. Balbi, R. Colbert, Anne Kinderlerer and Janet M. Allen 114

Glucagon and cAMP rapidly hyperpolarize the potential difference across the brush-border membrane (BBM) of isolated rat jejunum
P.A. Sharp and E.S. Debnam 115

Effect of acetylcholine (ACh) on the shunt conductance (G_s) in isolated epithelium from sheep trachea
Mercedes Acevedo 116

The postprandial alkaline tide in man: reality or myth?
A. Pestridge and C.D. Johnson 117

Projections from nucleus raphe obscurus to the dorsolateral/lateral and ventrolateral longitudinal columns of the PAG in the rat
F.M. Semenenko, B.M. Lumb and T.A. Lovick 118

Inputs from dorsal raphe nucleus to the periaqueductal grey matter: studies in anaesthetized rats and in slice preparations of midbrain maintained *in vitro*
T.A. Lovick and V.V. Stezhka 119

Projections from the rostral hypothalamus to the ventral medulla in the rat
P.M. Hudson, F.M. Semenenko and B.M. Lumb 120

The paradoxical effects of topical local anaesthetics: quantitative studies of sensory and autonomic function in human volunteers
Guy Jordan, Jane Ward and Stephen McMahon 121

Induction of the nitric oxide synthase, NADPH-diaphorase, in axotomized somatic sensory neurones in the rat
John Paul Carpenter, John Priestley and Stephen McMahon 122

5-HT_{1A}-receptors and descending inhibition of a spinal reflex in the decerebrated rabbit
R.W. Clarke and Andrea K. Houghton 123

Poster Communications

DIDS-sensitive pH_i regulation in single SHR cardiac myocytes under nominally bicarbonate-free conditions
Mei-Lin Wu, Min-Lih Tsai and Y.Z. Teng 124

Muscle strength changes during the menstrual cycle in human adductor pollicis
S.K. Phillips, J. Gopinathan, K. Meehan, S.A. Bruce and R.C. Woledge 125

The temporal expression of cellular oncogenes in mechanically stimulated skeletal muscle *in vivo*
N.J. Osbaldeston, D.M. Lee, V.M. Cox, L. Eaves, J.F.J. Morrison and D.F. Goldspink 126

Comparison of EMG responses recorded from upper and lower limbs in man to transcranial magnetic brain stimulation
M.A. Quinn, C. Martyn-Simmons, L.M. Harrison, J. Gibbs and J.A. Stephens . 127

Substance P (SP), neurofilament (NF), peripherin (PER) and SSEA4 immunocytochemistry of human dorsal root ganglion (DRG) neurones obtained from post-mortem tissue: a quantitative analysis
Lewis Holford, Patrick Case and Sally Lawson 128

Central localization of the superior laryngeal nerve in the ferret and mink
R.N. Ranson, P.J. Butler and E.W. Taylor 129

Simultaneous neurophysiological measures of sensory evaluation and motor preparation in children
M. Craggs, E. Taylor, Anne-Marie Walker and C. Andrew 130

Persistence of somatic and dendritic growth-associated processes in flexor motoneurones after neonatal nerve injury in the rat
Joanna Dekkers and Roberto Navarrete 131

The site of activation of descending motor pathways after transcranial electric stimulation over the motor cortex in man
J.C. Rothwell, D. Burke, R. Hicks, J. Stephen, I. Woodforth and M. Crawford. 132

Theta-rhythm stimulation changes the frequency dependence of CA3-CA1 synaptic transmission in hippocampal slices isolated from young rats
Yury Kovalchuk, Olga Garaschuk and Oleg Krishtal 133

Anoxia, *N*-methyl-D-aspartate (NMDA) and dizocilpine in rat, gerbil and guinea-pig olfactory cortex *in vitro*
Maged Yassin and C.N. Scholfield 134

Synaptic transmission and morphology in frog sympathetic ganglia anastomosed to the sixth spinal nerve
D. Eugène and J. Taxi 135

Purkinje cells from the mutant mouse Lurcher grown *in vitro*
Martin L. Doughty, Keith W.T. Caddy and Lilian Patterson 136

Electrophysiological properties of fasciculae cells isolated from bovine adrenal gland
A. Bilbaut, A. Chorvatova and C. Ojeda 137

Excitatory amino acid modulation of nociceptive synaptic input to spinal neurons of the anaesthetized rat
M.J. Cumberbatch, J.F. Herrero and P.M. Headley 138

Possible role for nitric oxide in thermal nociceptive reflexes and 'wind up' in the anaesthetized rat
M.L. Semos and P.M. Headley 139

Southampton Meeting

Demonstrations

The contribution of periodontal and gingival tissues to the laser Doppler blood flow signal recorded from human teeth
T.R. Amess, D. Andrew, H. Son and B. Matthews 142

The real-time measurement of glutamate efflux following changes in extracellular potassium concentration in rat hippocampus *in vitro*
P.T. Galley, M.A. Whittington, A. Poole and J.G.R. Jefferys 143

4-Aminopyridine and bicuculline together produce activity similar to drug-resistant late tonic activity found in a low magnesium model in rat entorhinal cortex slices *in vitro*
Steven D. Hunter, Uwe Heinemann and John G.R. Jefferys 144

Functional brain imaging from scalp recorded potentials in man
E.M. Sedgwick and V.S. Weerasinghe 145

An audio monitor for physiological and neurobiological studies
D. Yu. Budko, W.Winlow and L.L. Moroz 146

A simple instrument for electrical clearing of intracellular microelectrodes to limit cellular damage
D. Yu. Budko, L.L. Moroz and W. Winlow 147

The measurement of cardiac output by impedance cardiography, and the use of a computer to facilitate data analysis
B.J. Chapman and Alison B. Judd 148

Tutorial software for the Archimedes series of computers: histology without tears and the bionic frog
J. Bagust and J.T.R. Fitzsimons 149

Communications

The distribution of calcitonin receptor mRNA in rat brain as assessed by *in situ* hybridization
W.J. Sheward, E.M. Lutz and A.J. Harmar 150

Adult plasticity in the mouse barrel cortex: modified sensory transmission after partial peripheral denervation and subsequent regeneration; a single unit analysis under anaesthesia
E. Welker, M.-E. Corthésy and M. Armstrong-James 151

Thyrotropin-releasing hormone (TRH) facilitates NMDA receptor-mediated neurotransmission in the spinal cord of anaesthetized rats
Boris A. Chizh and P. Max Headley 152

Excitatory and inhibitory synaptic connectivity between cultured rat cerebellar granule cells
A.D. Randall, K. Deisseroth and R.W. Tsien 153

Kinetic analysis of EPSCs and IPSCs recorded from cultured rat cerebellar granule cells
A.D. Randall and R.W. Tsien 154

Excitatory synaptic potentials evoked in sympathetic preganglionic neurones by stimulating the rostral ventrolateral medulla (RVLM) in the neonatal rat brainstem–spinal cord preparation
Susan A. Marks and Shaun F. Morrison 155

Roles of glia, K^+ and proteases in traumatic conduction block of dorsal column axons in anaesthetized cats
M. Jayachandra and V.E. Amassian 156

Intracerebroventricular (I.C.V.) verapamil attenuates morphine withdrawal excitation of oxytocin neurones in anaesthetized rats
G. Munro, G. Leng and J.A. Russell 157

Characteristics of spinal neurones in awake, drug-free *versus* halothane-anaesthetized sheep
Juan F. Herrero and P. Max Headley 158

Rapidly inactivating ionic currents in granule-type neurones freshly isolated from the olfactory tubercle of the rat
A.L. Horne and J.V. Halliwell 159

The modulation by lanthanum of the gating of voltage-dependent potassium currents in rat isolated cerebellar granule neurones
Christopher S. Watkins and Alistair Mathie 160

Evidence for a rapidly gating M-current in rat Island of Calleja cells *in vitro*
J.V. Halliwell and A.L. Horne 161

Perinuclear elevation of calcium ion activity in response to activation of glutaminergic metabotropic receptors in acutely dissociated hippocampal neurones from neonatal rats
S. Phenna, S.D. Jane and J.E. Chad 162

Sodium nitroprusside, a nitric oxide donor, generates chromatic difference in the receptive field size of H1 horizontal cells in isolated retinae of carp
R. Petruv, T. Furukawa, S. Yasui and M.B.A. Djamgoz..... 163

Epileptic activity outlasts disinhibition in area CA3c and the dentate gyrus *in vitro* during the tetanus toxin model of chronic epilepsy in the rat
M.A. Whittington and J.G.R. Jefferys..... 164

The G_s-activated enhancement of cAMP levels contributes to cholera toxin-induced epileptogenesis in the rat hippocampal slice
Simon B. Colling, Miles A. Whittington and John G.R. Jefferys 165

Interneurones studied in rat neocortex *in vitro* display diverse electrophysiological and morphological characteristics
Jim Deuchars and Alex M. Thomson..... 166

Primrose seed oil given orally affects levels of polyunsaturated essential fatty acids (EFAs) in cell membrane phospholipids in close correlation with sensory nerve conduction velocity (NCV) in anaesthetized streptozotocin (STZ) diabetic rats
P.O.O. Julu, K. Jenkins and G.A. Jamal 167

Synaptic fatigue in the *Rana temporaria* optic tectum *in vitro* following repetitive stimulation of the optic nerve
Marco Atzori and Andrea Nistri 168

Long term reduction in feedforward inhibition in the dentate gyrus of urethane-anaesthetized kainic acid lesioned rats
P.A. Barrow, L.E. Sundstrom and J. Mitchell 169

Long-lasting potentiation of the NMDA receptor-mediated EPSC is inhibited by metabotropic glutamate receptor antagonists in rat dentate granule cells *in vitro*
J.J. O'Connor, M.J. Rowan and Roger Anwyl..... 170

LTP and LTD do not follow a Hebbian covariance rule in the kainic acid-lesioned rat hippocampus *in vitro*
C. Bernard and H.V. Wheal..... 171

Non-equivalent subsets of minimal EPSCs recorded from rat hippocampal CA1 pyramidal cells *in vitro*
J. Isaac, Y. Chen, D.A. Turner and H.V. Wheal 172

Single axon IPSPs elicited by morphologically identified interneurones in rat neocortex *in vitro*
Alex M. Thomson, David C. West and Jim Deuchars 173

Modulation of synaptic responses in CA1 pyramidal neurones of the rat hippocampus by activation of presynaptic $GABA_B$ receptors
S.J. Caddick and J.E. Chad 174

The effect of different divalent cations on A-currents recorded from neurones in isolated ganglia of the snail, *Helix aspersa*
Deborah M.E. Gilday and Robert W. Meech 175

Effects of pituitary adenylate cyclase activating peptide 1-38 (PACAP) on adrenal function in conscious hypophysectomized calves
C.T. Jones and A.V. Edwards 176

Rectification of the non-specific ion channel in fused synaptic vesicles of *Torpedo* nerve terminals *in vitro*
Nilly Yakir and Rami Rahamimoff 177

Oscillations in the activity of potassium channels from fused *Torpedo* synaptosomes
Jackie Edry-Schiller, Merav Rubin-Fraenkel, Shimona Ginsburg and Rami Rahamimoff 178

Site of action of 4-aminopyridine on mouse brain mKv1.1 cloned potassium channels expressed in Chinese hamster ovary cells
Gary J. Stephens, Jennifer C. Garratt, David G. Owen and Brian Robertson ... 179

Species difference in electrogenic Na^+–Ca^{2+} exchange current in isolated rat and guinea-pig ventricular myocytes
H. Ichikawa and W.A. Coetzee 180

Developmental changes in the electrogenic Na^+–Ca^{2+} exchange current density in voltage clamped, isolated rabbit ventricular myocytes
William A. Coetzee, Metin Avkiran, David J. Hearse and Michael Artman 181

Chemical oxidation of sulphydryl groups results in a depression of Na^+–K^+ pump current in isolated adult guinea-pig ventricular myocytes
Peter S. Haddock and Michael J. Shattock 182

Stretch-induced ventricular fibrillation in normal and globally anoxic isolated guinea-pig hearts
M.J. Lab, B.Y. Zhou, D.J. Dick, S.H. Horner, C.F. Murphy and F.G. Harrison 183

Ventricular arrhythmogenesis is enhanced by mechanoelectric feedback in regional ischaemic heart of the anaesthetized pig
B.Y. Zhou, F.G. Harrison, D.J. Dick, S.H. Horner, C.F. Murphy and M.J. Lab 184

Effect of workload and hypoxia on glutamine catabolism in the isolated working rat heart
S.E.O. Khogali, A.A. Harper and M.J. Rennie 185

Effect of low, normal and high magnesium diets on growth and cation concentrations in plasma, bone and heart of young rats
F.C. Howarth, J.J. Waring and J. Singh 186

Halothane induces paroxysmal depolarization shifts in synaptically isolated *Lymnaea* neurones *in situ* and in culture
A. Walcourt-Ambakederemo and W. Winlow 187

Nitric oxide modulates the central respiratory patterns in *Lymnaea stagnalis*
L.L. Moroz and J.-H. Park 188

Serotonergic modulation of a spinal locomotor rhythm generator in *Xenopus* larvae: activation of 5-HT_{1a} receptors
John F. Scrymgeour-Wedderburn and Keith T. Sillar 189

Two different rhythmic motor responses to excitatory amino acid agonists in the *Xenopus* embryo spinal cord
S.R. Soffe 190

Sensory processing in the leech nervous system
T.F. Carlton and A.R. McVean 191

Electrical and optical recordings of evoked activity in squid optic lobe slices
R. Williamson, M. Ichikawa and G. Matsumoto 192

A comparative study of histamine-gated chloride channels in isolated large monopolar cells (LMCs) in Diptera: tuning synapses to visual ecology
D.R. Skingsley, R.C. Hardie and S.B. Laughlin 193

Electrical interactions between spinal motoneurones in the *Xenopus laevis* embryo
Ray Perrins and Alan Roberts 194

Transmission of signals across the first synapse in the ocellar pathway of the locust *Locusta migratoria*
Peter J. Simmons 195

Synapse formation in culture by an identified dopamine-containing neurone of the snail *Helisoma*
S.J. Harris and G.A. Cottrell 196

$GABA_B$ receptors reduce an ω-conotoxin-sensitive calcium current in isolated spinal neurons essential for synaptic transmission in *Xenopus* embryos
M.J. Wall and N. Dale 197

Variant synaptic connections in the respiratory central pattern generator in semi-intact preparations of *Lymnaea*
J.-H. Park and W. Winlow 198

Effects of theophylline and chronic hypoxia upon the respiratory responses to alternations of F_{i,O_2} in conscious, newborn rats
R.C. Landauer and P. Kumar 199

The influence of adenosine on muscle microcirculation of the chronically hypoxic rat under anaesthesia
Rubina Mian and Janice M. Marshall 200

The influence of chronic hypoxia from birth on the respiratory and cardiovascular systems studied in the rat under anaesthesia
Teresa Thomas and Janice M. Marshall 201

Endocrine responses of the llama fetus *in utero* during acute hypoxaemia at 0·6–0·7 of gestation
D.A. Giussani, H.H.G. McGarrigle, R.A. Riquelme, F.A. Moraga, C.R. Gaete, E.M. Sanhueza, M.A. Hanson and J.A. Llanos 202

Effect of muscle ischaemia on reactivity of rat aorta *in vitro*
Geraldine Brown and Olga Hudlicka 203

Mean circulatory filling pressure, vascular compliance and the effects of scald burn injury in the anaesthetized rat
B.J. Chapman and E.A. Speakman 204

Pre-systolic flow reversal in the femoral artery in healthy young men detected by magnetic resonance imaging: possible association with isovolumic cardiac contraction
C.G. Caro, G. Cybulski, R.D. Darrow, D.J. Doorly, C.L. Dumoulin and M. Tarnawski 205

Subclasses of fusimotor action on cat muscle spindles of the anaesthetized cat revealed by cross-correlation of firing with random stimulation
R. Durbaba, A. Taylor, J.F. Rodgers and A.J. Fowle 206

Colour vision responses in a human patient with cerebral achromatopsia
C. Kennard, A.B. Morland and K.H. Ruddock 207

Magnetic cortically evoked potentials from arm muscles in recently injured tetraplegics and controls: no evidence for early motor reorganization
J.D. Cole, W.L. Merton, H.I. Philip, D. Grundy and A. Tromans 208

Cortical somatotopic representation of the hand as detected from human scalp recorded evoked potentials
V.S. Weerasinghe, E.M. Sedgwick, C. Carr and T.B. Docherty 209

Voluntary movements are not phase-locked to small rhythmic passive movements in man
M. Lakie and F. Villagra 210

Evidence of a limited motor memory for wrist movement in a subject with peripheral neuropathy
R.C. Miall, P.N. Haggard, J.F. Stein and J. Cole 211

Control of human leg muscles prior to landing from falls
M. Santello, M.J.N. McDonagh and M. Harakis 212

Quadriceps strength in adult growth hormone deficiency before and during growth hormone treatment
O.M. Rutherford, S.A. Beshyah and D.G. Johnston 213

Effect of luminal vasopressin on intracellular calcium in rat medullary thick ascending limb (mTAL) microperfused *in vitro*
W.J. Burgess, R.J. Balment and J.S. Beck 214

Effect of luminal citrate and oxalate on fluid reabsorptive rate (J_v) in the proximal convoluted tubule of the anaesthetized rat
M. Wareing 215

A diffusion gradient favouring potassium reabsorption exists in the proximal convoluted tubule of the anaesthetized rat
J.D. Kibble, R.W. Wilson and R. Green 216

Luminally applied barium as a K^+ channel blocker in the proximal convoluted tubule of the anaesthetized rat: non-specific site of action
R.W. Wilson, J.D. Kibble, M. Wareing and R. Green 217

Cell swelling and transplant preservation fluids in rabbit kidney proximal tubule
K.J. Sewell, J.P.A. Lodge and D.J. Potts 218

The effect of cadmium on glomerular basement membrane thickness in the domestic fowl
J.M. Bennett, D.N. Prashad, R.O. Blackburn and R. Deane 219

Dose–response relationship for the renal magnesium-wasting effect of bumetanide in conscious chronically catheterized Sprague–Dawley rats
S. Jacobs 220

Possible effects of Uranyl nitrate-induced acute renal failure on the control of renin release from superfused dispersed rat kidney cortex cells
M.-A. D'Aloia and A.R. Noble 221

The L-arginine : nitric oxide pathway and its possible role in the control of renin secretion from superfused dispersed rat kidney cortex cells
M.-A. D'Aloia and A.R. Noble 222

Vasopressin-induced natriuresis in anaesthetized Brattleboro rats: dependence on volume expression
V. Tennakoon, J.A. McClune, S.J. Walter and D.G. Shirley 223

Hypoxia and hypercapnia as stimuli of the afferent renal nerves in the anaesthetized rabbit
N. Ashton, C.G. Clarke, D.E. Eddy and F.V. Swift 224

The human red cell Ca-ATPase is altered by EGTA
P.J. Romero and V. Salas 225

Uptake of ^{60}Cobalt into rat erythrocytes *in vitro* is selectively stimulated by L-histidine
N.M. Horn and A.L. Thomas 226

The pH amplifying effect of the band 3 anion exchanger of human red blood cells
W.F. Widdas and G.F. Baker 227

Evidence for a proton (or proton equivalent) conductive pathway in the plasma membrane of sheep tracheocytes
Mercedes Acevedo 228

Evidence for a sodium-dependent magnesium transporter in isolated rat pancreatic acinar cells
D.M. Wisdom, Maria Geada and J. Singh 229

Astroglial response to γ-aminobutyric acid in the isolated intact rat optic nerve: a developmental study
Jason M. Jennings and Arthur M. Butt 230

Sodium and calcium currents in cultured cochlear hair cells of neonatal mice
C.J. Kros, A. Rüsch, G.P. Richardson and I.J. Russell 231

Astroglial association with nodes of Ranvier in the mouse optic nerve: a morphological study
A.M. Butt, K. Colquhoun, A. Duncan and M. Berry 232

Fluid secretion by the Malpighian tubule of *Drosophila melanogaster* is stimulated by nitric oxide and cyclic GMP
J.A.T. Dow and S.H.P. Maddrell 233

Intracellular pH of fast muscle from an Antarctic teleost (*Harpagifer antarcticus*) estimated *in vivo* by ^{31}P NMR
S. Egginton and T.S. Moerland 234

Effects of acute temperature change and thermal acclimation on membrane rigidity of fish erythrocytes
T. Lecklin, G.B. Nash and S. Egginton 235

Effect of capsaicin on heart rate and fictive ventilation in the decerebrate dogfish (*Scyliorhinus canicula*)
James F.X. Jones, Michael Young, David Jordan and Edwin W. Taylor 236

Gait analysis in the rat as a model for vascular disease
J.R. Rochester and K.A. Clarke 237

Involvement of a nitric oxide-dependent myenteric reflex in the activation of intestinal secretion in the rat by enterotoxin STa *in vitro* and *in vivo*
Vivien Rolfe and R.J. Levin 237

Poster Communications

Effects of APNFLAYPRLamide on central neurones of the snail, *Helix aspersa*
M.L. Chen and R.J. Walker 238

The nematode peptide, Ser-Asp-Pro-Asn-Phe-Leu-Arg-Phe-NH_2 (PF1), inhibits synaptic transmission in the parasitic nematode *Ascaris suum*
Christopher J. Franks, Lindy Holden-Dye and Robert J. Walker 239

A novel azole compound antagonizes the bicuculline-insensitive, baclofen-insensitive GABA receptor in the parasitic nematode *Ascaris suum*
Z. Bascal, R.J. Willis and L. Holden-Dye 240

The effects of sodium deoxycholate on potassium permeability of the perineurium in the isolated sciatic nerve of the frog, opossum and rat
Barbara Anne Todd, C. Inman and N. Joan Abbott 241

The actions of the –SSFVRIamide family of peptides on identified visceral ganglia neurones of the snail, *Helix aspersa*
S.M. Pedder 242

Synaptic interactions between sensory hair cells in the isolated statocyst of the squid, *Alloteuthis subulata*
A. Chrachri and R. Williamson 243

Responses *in vivo* to light signals by large, second-order ocellar neurones of the blowfly, *Calliphora erythrocephala*
Peter J. Simmons, Shi Jian and F. Claire Rind 244

Multicomponent synaptic connections between identified feeding neurons in the pond snail *Lymnaea stagnalis*
À. Vehovszky, M. Yeoman and C.J.H. Elliott 245

Selective recruitment of crayfish leg motoneurones by different proprioceptive inputs
Peter Skorupski and Brian M.H. Bush 246

Abundance of putative NO-synthesizing cells in the oesophagus of Gastropod molluscs
L.L. Moroz, I. Roger, N.I. Syed, A.G.M. Bulloch and K. Lukowiak 247

Evidence for functional inositol 1,4,5-trisphosphate receptors in the CNS of the cockroach *Periplaneta americana*
Jonathan A. David and Robert M. Pitman 248

Variable behaviour of an identified neurone, the Retzius cell of *Hirudo medicinalis*
Lucy D. Leake 249

Magnetic stimulation of cervical and lumbosacral spinal roots in man
A.R. Jamshidi Fard and E.M. Sedgwick 250

Arginine vasopressin V_{1a} receptors are distributed on blood vessels of the spinal cord of the rat
E. Sermasi, J. Howl, M. Wheatley, S. Pyner and J.H. Coote 251

NADPH-diaphorase staining in the CNS of frog *Rana ridibunda*
A.V. Gourine and B.V. Lysy 252

Functional properties of the M-group neurones in the visceral ganglion of the freshwater pulmonate, *Lymnaea stagnalis*
D. Yu Budko 253

Regulation of KCl co-transport in horse red blood cells
H. Godart, J S. Gibson and J.C. Ellory 254

The effect of temperature on pacemaker activity in the isolated heart of the marine teleosts saithe (*Pollachius virens*) and plaice (*Pleuronectes platessa*)
J.D. Windram, A.A. Harper and P.W. Watt 255

Measurement of intracellular calcium in osteoclast monolayers isolated from medullary bone of Japanese quail
S. Arkle, I.M. Wormstone, Z.A. Bascal and C.G. Dacke 256

Characterization of a volume-activated taurine flux in *Xenopus laevis* erythrocytes
U. Katz, J.-A. Lancaster and J.C. Ellory 257

Mechanosensitive electrically non-excitable cells in the atria of frog and rat heart
D. Kondratjev, A. Pylaev, I. Kiseleva, P. Kohl and A. Kamkin 258

Peripheral electrical stimulation of the cardiac nerves in the decerebrate dogfish (*Scyliorhinus*)
M.J. Young, E.W. Taylor and P.J. Butler 259

Effects of entrainment on dorsal root activity in an isolated spinal cord preparation of juvenile rats
Aarnoud J. Dekhuijzen and Jeffery Bagust 260

c-*fos* expression in an isolated rat spinal cord preparation is blocked by manganese
Liping Zhang, R.G. Williams and J. Bagust..... 261

A mathematical model of retinoblastoma incidence
R.A. Lloyd and D.G. Papworth 262

Effects of acetylcholinesterase on the membrane properties of guinea-pig hippocampal pyramidal cells recorded intracellularly *in vitro*
M.E. Appleyard 263

Inactivation peptides and their effects on a cloned brain K^+ channel, mKv1.1, and voltage-activated K^+ currents in rat dorsal root ganglion neurones, *in vitro*
Fay Heblich, Brian Robertson, Gary J. Stephens Albert Opalko and David G. Owen 264

NADPH diaphorase activity, a marker for nitric oxide synthase, in adult rat thymus
J.E.G. Downing and P. Orti-Garces 265

Two types of voltage-dependent potassium currents in isolated thymic epithelial (nurse) cells of the rat
E.B. Stevens and J.E.G. Downing 266

Inhibition of calcineurin reduces desensitization of 5-HT_3 receptors in NG108-15 neuroblastoma × glioma hybrid cells
J.B. Arbuckle, I. Meigel, H.W.G.M. Boddeke and R.J. Docherty 267

Vasopressin stimulates cAMP generation in rat inner medullary collecting duct cells
W.J. Burgess, R.J. Balment and J.F. Laycock 268

Renal excretion in a rat model of combined hypertension and diabetes mellitus
K. Hamilton and H.O. Garland 269

Assessment of glomerular filtration rate in conscious and in anaesthetized rats using the plasma disappearance of ^{99m}Tc diethylenetriaminepentaacetic acid (DTPA)
R.M. Chamberlain and D.G. Shirley 270

The influence of calcium channel blockade on pressure–natriuresis curves in the anaesthetized rat
Chunlong Huang, Gerard Davis and Edward J. Johns 271

Acute effects of gentamicin on urinary NAG and calcium excretion in the anaesthetized rat
P.P. Parsons, H.O. Garland and E.S. Harpur 272

The effect of chronic erythropoietin treatment on blood pressure and renal haemodynamics in the rat
Chunlong Huang, Gerard Davis and Edward J. Johns 273

The effect of neutral endopeptidase inhibition on the renal response to substance P in anaesthetized rats
S.A. Taylor and R.J. Unwin 274